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Controlled Grazing of Irrigated Pastures

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Irrigated pastures are not new any more—not new in the sense they were ten years ago. We have learned a lot since then. But with all the things we have learned, our present position can be compared to that of an engineer who has developed a new engine. His engine works, and works well, but it needs a little more engineering, and a few more refinements, to develop its full power.

It's that way with our irrigated pastures today. They work, and work well, but we are not getting the production from them that they are capable of giving.

This thought-provoking article written by Dr. Maurice L. Peterson, Associate Professor of Agronomy, University of California, tells of one important way to get more production from your pasture. Read it carefully. See if you can't apply some of these facts to your operation.

Controlled grazing can do more to pep up tired pastures — and at less expense to the farmer — than any new improvement practice which has come across the pasture scene for some time. That's the opinion of a number of progressive, profit-minded California dairymen. Research at Davis has shown why pastures are more productive when the natural grazing habits of animals are regimented in this manner.

Controlled grazing means, simply, restricting the area upon which livestock can graze in any one day or short period of days. This procedure assures uniform grazing and little or no waste. More important than that, the pasture is not trampled over time and again by the cow whose natural instincts tell her that the tuft of grass just 10 feet ahead is more juicy and tasty than the one where she is standing. Carefully controlled experiments have shown that the taller the pasture — the faster it grows, at least up until it begins to reach maturity. Controlled grazing takes advantage of this period of rapid growth. This usually cannot be done with unrestricted grazing.

Controlled Grazing Not New

It has been said that controlled grazing is just an old idea dressed up in a new garb. It is true that the idea is old enough, but it is placed in an entirely new set of surroundings in California's irrigated pastures. This method of grazing was practiced in central Europe nearly 40 years ago. It came into being as a necessity for maximum food production in a war-torn continent faced with the threat of starvation. However, Europeans are still practicing controlled grazing today, as are the British and the New Zealanders. These people have a profound respect for grass. It's a major agricultural crop with them and they have a deep appreciation of its importance to the agricultural economy of their countries.

During the early 1920's, various systems of rotation grazing were tried in the eastern half of the United States. These trials were mostly patterned after the European method which had become known as the Hohenheim system of grazing. The essentials of this system were as follows:

1) The division of the pasture into from 4 to 8 units of about equal size.
2) Heavy applications of fertilizers, especially nitrogen.
3) Separation of the dairy herd into two groups, the producers and the non-producers. The producers got first chance at the pasture.
4) Frequent rotation of these groups from pasture to pasture.

For reasons which were not too apparent at that time, the grazing system didn't live up to expectations and the idea eventually died of neglect. Pasture research workers went on to studies of pasture fertilization, improved pasture mixtures, the breeding of better pasture varieties, and to pasture irrigation with all of its many problems of management. All of this good work was the "stage setting" for the re-entry of the controlled grazing concept. With these better varieties and mixtures, improved fertility, and control of soil moisture, controlled grazing has assumed more importance than ever.

Controlled grazing calls for a series of separate pastures. The number of individual pastures depends on many things, but here is the simple, workable layout used on the Ira E. Barkley ranch near Greenfield, California. Cattle can be shunted from the center lane into any of the four pasture units. The opened pasture gates block the lane and force cattle into the desired pasture. The lot in the immediate left foreground is for watering and supplemental feeding. The cattle are rotated counter clockwise and will next be moved to the pasture in the right foreground.

On the Paul Tiedemann ranch near St. Helena, California, 60 to 70 cattle are concentrated on an area 45 feet wide by 300 feet long. Cattle are rotated to a fresh pasture each morning and evening. A smooth-wire portable electric fence is used to confine the cows. Concentrated grazing like this assures a complete cleanup of all feed, a minimum of trampling, and high yields of first-quality forage. When cows are turned into large pastures, they graze very selectively and leave the grasses they don't like. This, in time, can cause a ragged, unproductive pasture.

Controlled Grazing Research

Experiments have been in progress at the University of California over a three-year period to determine the most efficient system of controlled grazing. Only, in these studies, the mowing machine was used to "graze" the different mixtures in various ways. It must be admitted that grazing with livestock and cutting with the mowing machine may be as different as day and night. However, the purpose of these studies was to learn something about the physiology of the grass to determine how pastures responded when the top growth was removed at intervals ranging from two to five weeks. The behavior of cows will be studied in another experiment.

Three common pasture legumes were studied — alfalfa, ladino clover and birdsfoot trefoil. Each was seeded with a mixture of grasses consisting of the ryegrasses, orchard grass and alta fescue. A mixture of all three legumes with grasses was also tested.

These mixtures received four different clipping treatments with different time intervals for regrowth which might correspond to controlled grazing schemes. The regrowth periods were two, three, four, and five weeks. Well over 2,000 yield determinations have been made and each treatment was repeated six times for accuracy in each of three successive seasons.

The average yield of all the mixtures when cut every two weeks over a three-year period was 4.56 tons annually on a hay weight basis. Yields were increased 23 per cent by allowing three weeks of regrowth, 50 per cent with four weeks, and 92 per cent — 8.77 tons — with five weeks of regrowth.

Some of the mixtures were more sensitive to frequency of clipping than others. The alfalfa-grass mixture produced only 3.72 tons when cut at two-week intervals but 10.30 tons were obtained by cutting intervals of five weeks, an increase of 177 per cent. Ladino clover-grass mixtures were also benefited by less frequent cutting. However, the yield of 5.59 tons, obtained when cut at two-week intervals, was the highest among all the mixtures when cut at this frequency. By extending the interval to five weeks, production was stepped up 43 per cent to 8.00 tons per acre. Even the trefoil-grass mixtures (broadleaf type) showed a yield increase of 90 per cent with the less frequent cutting.

Using the average yields for all mixtures for the three years and making an appropriate adjustment for the waste there would be if these mixtures were grazed instead of clipped, a 20-acre pasture would carry 21 animal units — mature cows — for eight months if grazed every two weeks; 27 cattle if grazed every three weeks; 31 cattle if grazed every four weeks; and 40 cattle if grazed every five weeks. Only volume of feed, not quality, is considered in the above figures.

Grazing Frequency Affects Feed Quality

The quality, or feeding value, of the pasture was reduced by spacing the clippings at wider intervals. Samples of the forage from each of the mixtures and clipping treatments were collected in July of 1950 for chemical analysis.

In almost every case, the protein percentage decreased and the crude fiber increased as clipping intervals were

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spaced farther apart. The drop in protein percentage, while significant in amount, was probably not too important to the grazing animal. Even the lowest protein contents obtained were far in excess of animal needs. On a dry weight basis, the protein percentage of the ladino-grass mixture ranged from 27 per cent, when cut every two weeks, to 19.6 per cent when harvested at five-week intervals. Crude fiber percentages were 16.8 and 23.2 per cent for these same clipping treatments. As the protein content decreased, crude fiber increased.

Alfalfa-grass mixtures were higher than clover in both protein and crude fiber for all cutting treatments, but the trends were the same. The trefoil was the lowest among the legumes in protein content but even with infrequent cutting the amount was ample to meet livestock needs.

The importance of the moisture content of fresh pasture is sometimes overlooked. In these experiments, the ladino clover-grass mixture was the most succulent among the different mixtures. The average dry matter percentage was 16.2 per cent. A steer consuming 100 pounds of green feed was taking in nearly 84 pounds of water and only 16 pounds of dry matter. To obtain 25 pounds of dry feed, the animal would have to consume 154 pounds of green feed. This test may explain why some supplemental dry feed with the clover pasture may improve livestock gains.

Alfalfa-grass and trefoil-grass mixtures each contained about 19.5 per cent dry matter—and, strangely enough, the frequency of cutting did not have much effect on the percentage of dry matter. Although the percentage of dry matter normally increases as the forage becomes more mature, the legumes — higher in moisture than the grasses—increased proportionately as the clippings became less frequent. This about offsets the expected differences in dry matter with increasing maturity.

Stockmen Applying Controlled Grazing

Actual grazing trials are needed to fully answer the problems of controlled grazing. Such experiments are being initiated at Davis through cooperative work between the Animal Husbandry and Agronomy Divisions. The results of similar experiments have been published by research workers in Great Britain and the Netherlands. In the meantime, a number of good dairymen are now using controlled grazing in various forms with excellent results.

One of these dairymen is Paul Tiedemann of St. Helena in Napa County. By using a portable electric fence he gives his herd of 60 to 70 cows a fresh pasture each morning. He varies the size of the grazing area according to the amount of grass available, but last fall he was using an area 300 feet long and 45 feet wide for the 60 to 70 cows. A pasture of similar size was provided after the evening milking — thereby actually giving the cows fresh pasture twice a day.

Tiedemann was as surprised as anyone to find his dairy cows — which had become as finicky as a spoiled child about their food — were grazing the pasture as slick and clean as a newly mown lawn. After a half day on this small-sized pasture, everything had been eaten. There were no coarse clumps of unpalatable grasses, no wasted feed around manure droppings, and even the common weeds had been nipped off along with the pasture plants. Selective grazing, on the other hand, has turned many a good pasture into a disappointing stand of an unpalatable species.

The fresh pastures had a three-weeks' accumulation of growth consisting of ladino clover, ryegrass, alta fescue, and orchardgrass. By using a rather fine, smooth wire mounted on a home-made reel and some light weight steel posts, Tiedemann could fence in his new pasture in about 20 minutes. This is about the same amount of time required to give the cows a feeding of hay — not counting labor and time spent in mowing, raking, and hauling the hay to the barn.

Another farmer in Sacramento County uses a deep-sea fishing reel with a copper wire for his moveable fence. The wire can be rolled up as fast as he can walk across his field.

Many farmers prefer to build permanent subdivisions through the pasture rather than move the fence each day. The important thing here is to make the subdivisions small enough so they can be grazed down in a very few days.

Many stockmen are practicing rotation grazing using from 3 or 4, up to as many as 30 pastures in the rotation. But not all these rotation grazing systems are entirely successful. For example, a farmer in one of the coastal counties had his pastures too large and the feed became coarse and unpalatable before the cattle were able to graze it down. Each field should be small enough so that it can be grazed down in about 5 days or less. Six pastures grazed 5 days each will allow a 25-day period for regrowth. The six-pasture system fits most farm operations very nicely.

The intervals between grazings, while very important, are not as exacting as the intervals between irrigations. Therefore, to avoid grazing when the pastures are wet, the grazing cycle must be adjusted to fit in with the irrigation cycle. It is not possible to make recommendations for controlled grazing to fill all situations because each farm is a special and somewhat different problem. These will have to be worked out individually. The important point to remember is that overgrazing reduces pasture yields; undergrazing permits some of the grass to become more mature, and this results in loss in feed quality and livestock gain. Controlled grazing will make it possible to graze when the grass is at its best.